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# **Operating System Lab Assignment I**

### **4ITRC2**

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*BE II Year*

*Information technology – ‘A’*

# Aim

To install and study Ubuntu OS

# To perform

Install VMware or Virtual Box and Ubuntu over Windows OS

# To Submit

Study of Ubuntu OS

## **Introduction (in brief about Linux and Ubuntu, its versions + some history)**

Linux is a family of open-source, Unix-like operating systems based on the Linux kernel, which was created by Linus Torvalds in 1991. It is one of the most prominent examples of free and open-source software collaboration, meaning anyone can use, modify, and distribute its source code. Linux is widely used in servers, desktops, embedded systems, and even supercomputers due to its stability, security, and flexibility. Linux supports multiple users and can run multiple processes simultaneously.

Linux distributions (distros) or linux flavors are operating systems built on top of the Linux kernel. Examples include **Ubuntu**, **Fedora**, **Debian**, **CentOS**, and **Arch Linux etc**.

Ubuntu is one of the most popular Linux distributions, designed to be user-friendly and accessible for both beginners and advanced users. It is based on **Debian** and is developed by **Canonical Ltd.**, a company founded by **Mark Shuttleworth**. Ubuntu was first released in **October 2004** and has since become a leading choice for desktop, server, and cloud computing.

### A brief history of Ubuntu

* 2004: Ubuntu was launched by Canonical Ltd. with the goal of creating a user-friendly Linux distribution.
* 2006: The first Long-Term Support (LTS) version, Ubuntu 6.06 (Dapper Drake), was released. LTS versions are supported for five years, making them ideal for enterprise use.
* 2010: Ubuntu introduced the Unity desktop environment with Ubuntu 10.10, replacing GNOME as the default interface.
* 2017: Ubuntu switched back to GNOME as its default desktop environment starting with Ubuntu 17.10.
* 2020s: Ubuntu continues to dominate the Linux desktop and server markets, with a strong focus on cloud computing, IoT, and containerization (e.g., Docker, Kubernetes).

### Ubuntu Versions

Ubuntu releases are named in the format **YY.MM** (year and month of release) and are given alliterative codenames based on animals. For example:

**Ubuntu 20.04 LTS (Focal Fossa)**: Released in April 2020, this LTS version is supported until 2025.

**Ubuntu 22.04 LTS (Jammy Jellyfish)**: Released in April 2022, this LTS version is supported until 2027.

**Ubuntu 23.10 (Mantic Minotaur)**: Released in October 2023, a non-LTS version with the latest features.

### Ubuntu Variants (Flavors)

Ubuntu comes in several official flavors, each tailored for different use cases or preferences:

* **Ubuntu Desktop**: The standard version for personal computers.
* **Ubuntu Server**: Optimized for server environments.
* **Kubuntu**: Uses the KDE Plasma desktop environment instead of GNOME.
* **Xubuntu**: Uses the lightweight XFCE desktop environment, ideal for older hardware.
* **Lubuntu**: Uses the LXQt desktop environment, designed for low-resource systems.
* **Ubuntu Studio**: Tailored for multimedia production (audio, video, graphics).
* **Ubuntu MATE**: Uses the MATE desktop environment, a continuation of GNOME

## **Features of Ubuntu**

Ubuntu offers a wide range of features that make it a preferred choice for developers, businesses, and general users. Some of its key features include:

#### Open-source and Free

Ubuntu is completely free to use, modify, and distribute. Its open-source nature allows developers to customize it according to their needs, and a large global community actively contributes to its development.

#### *Security and Stability*

Ubuntu is known for its robust security measures, with built-in firewall protection, AppArmor security modules, and automatic security updates. Its LTS versions receive long-term support and critical security fixes.

#### *User-friendly Interface*

Ubuntu provides an intuitive and modern graphical user interface (GUI) with the GNOME desktop environment by default. Users can also switch to other desktop environments like KDE (Kubuntu), XFCE (Xubuntu), and LXQt (Lubuntu) based on their preferences.

#### *Software and Application Support*

Ubuntu comes with a vast software repository that includes thousands of free and open-source applications. It supports package management through APT (Advanced Package Tool) and Snap, allowing users to install software effortlessly.

#### Customization

Unlike many proprietary operating systems, Ubuntu allows extensive customization. Users can change themes, icons, window managers, and desktop environments, giving them complete control over the look and feel of their system.

#### Lightweight and Performance Efficient

Ubuntu is optimized to run on a wide range of hardware, from modern PCs to older machines. Lightweight variants like Lubuntu and Xubuntu are designed to function efficiently on low-end hardware with minimal resource consumption.

#### Built-in Development Tools

Ubuntu is a preferred OS for developers due to its native support for various programming languages such as Python, C, C++, Java, and Go. It also includes tools like Git, Bash scripting, and a terminal-based command-line interface for advanced system management.

#### Cloud and Server Capabilities

Ubuntu Server is widely used for web hosting, cloud computing, and enterprise solutions. It is the most popular Linux distribution for cloud computing platforms like AWS, Google Cloud, and Microsoft Azure. Additionally, it has built-in support for containerization technologies like Docker and Kubernetes.

#### Regular Updates and Strong Community Support

Ubuntu benefits from frequent updates and a strong support community. Users can seek help through forums, online documentation, and Ubuntu’s extensive knowledge base.

#### Multilingual Support

Ubuntu offers support for multiple languages, making it accessible to users worldwide.

#### Gaming Support

While gaming on Linux was traditionally limited, Ubuntu now supports gaming platforms like Steam, Proton (for running Windows games on Linux), and Lutris, making it a viable choice for gamers.

#### Compatibility with Windows Applications

Ubuntu can run many Windows applications using compatibility layers such as Wine and PlayOnLinux.

These features make Ubuntu an excellent choice for various use cases, including personal computing, enterprise servers, cloud environments, and embedded systems.

## **Difference between ubuntu and windows OS**

Ubuntu and Windows are two widely used operating systems, each catering to different user needs. Below is a detailed comparison:

### Cost and Licensing

* **Ubuntu:** Completely free and open-source. Users can install, modify, and distribute it without any licensing fees.
* **Windows**: Requires purchasing a license for installation. Different versions (Home, Pro, Enterprise) come with varying costs, although some versions come pre-installed on new PCs.

### Security

* **Ubuntu:** Generally considered to be more secure due to its Unix-based architecture and the fact that it is less targeted by malware compared to Windows.
* **Windows:** Has historically been more vulnerable to viruses and malware, partly due to its widespread use. However, Microsoft has made significant improvements in security with features like Windows Defender and regular updates.

### Customization

* **Ubuntu**: Highly customizable, allowing users to change almost every aspect of the system's appearance and behavior like desktop environments, themes, and system configurations.
* **Windows**: Offers some level of customization, but not to the same extent as Ubuntu. The system is more controlled to ensure stability and compatibility. In short, limited customization options, mostly restricted to themes and wallpapers.

### Software Availability

* **Ubuntu**: Has a wide range of free software available through its package manager and software center. It also supports a variety of open-source applications.
* **Windows**: Has a vast library of software, including both free and paid applications. It is the primary platform for many commercial software products and games including Microsoft Office and Adobe products.

### Performance and Resource Usage

* **Ubuntu:** Often runs faster on older hardware due to its lighter system requirements compared to Windows.
* **Windows:** Can be more resource-intensive, especially the latest versions, which may require more powerful hardware to run smoothly.

### Support and Troubleshooting

* **Ubuntu**: Ubuntu relies on community forums, documentation, and volunteer help. Troubleshooting Ubuntu often involves learning more about how the system works**.**
* **Windows**: Windows has official Microsoft support channels. Windows troubleshooting frequently leads to generic solutions like restarting.

### User Interface

* **Ubuntu**: Traditionally uses the GNOME desktop environment, which is known for its simplicity and efficiency. However, Ubuntu supports other desktop environments like KDE, XFCE, and LXDE.
* **Windows**:  Uses a graphical user interface that has evolved over the years, with the latest versions featuring the Fluent Design System, which includes elements like Acrylic (transparency effects) and Reveal (highlighting).

### System Updates

* **Ubuntu**: Frequent updates with strong security patches. LTS versions provide stability for long-term use.
* **Windows**: Periodic major updates and patches, often requiring system restarts.

### Compatibility:

* **Ubuntu:** May have compatibility issues with certain hardware and software, especially proprietary formats and some commercial applications.
* **Windows:** Has broad compatibility with a wide range of hardware and software, making it a versatile choice for many users.

### File System

* **Ubuntu**: Uses EXT4 by default, but supports other Linux file systems. Ubuntu uses a unified file hierarchy. In Ubuntu, everything stems from the root directory (/) with standardized subdirectories.
* **Windows**: Uses NTFS and FAT file systems. Windows uses drive letters (C:, D:, etc.).

Ubuntu is preferred by developers, system administrators, and security-conscious users, while Windows remains the dominant choice for general consumers, gamers, and enterprise environments that rely on proprietary software. The choice between Ubuntu and Windows depends on individual needs—whether one values open-source flexibility and security or extensive software compatibility and ease of use.